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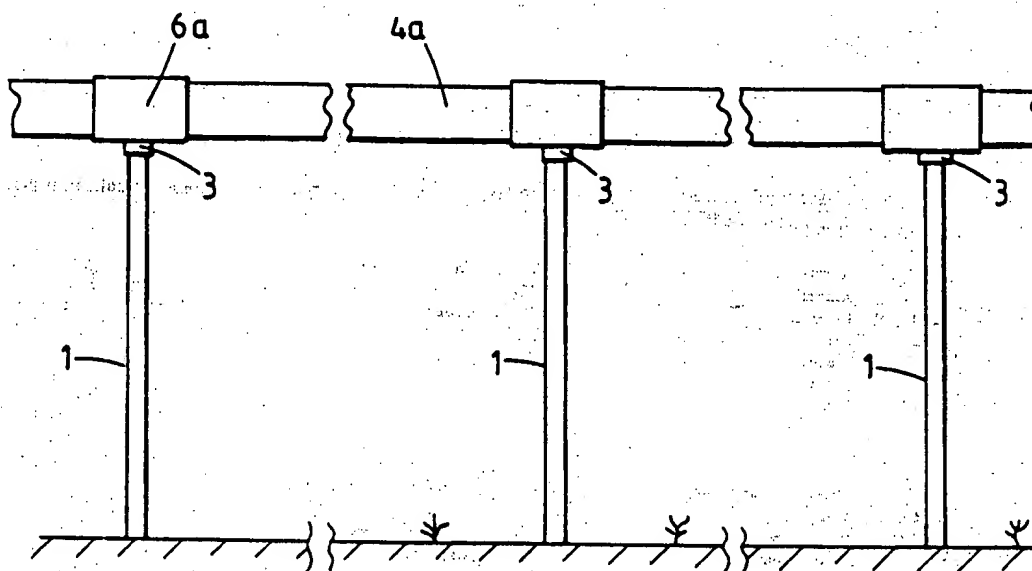
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: BARRIER



(57) Abstract

A barrier system comprises a plurality of tubular uprights (1) and a pair of parallel rails (4, 4a) held in spaced apart relation on opposite sides of the uprights (1). The rails (4, 4a) are preferably connected to T-pieces (3) mounted on the upper ends of the uprights (1). Each rail (4, 4a) preferably comprises lengths of extruded plastics tubing disposed end-to-end. The rails (4, 4a) and the uprights (1) are preferably of extruded polyvinylchloride. Preferably, the uprights (1) are located in sunken fixings (2), each fixing (2) having a vertical channel which receives the lower end of an upright (1).



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Title: Barrier

This invention relates to a barrier system, in particular to a barrier system for use at sporting venues.

Barrier systems are used at sports venues for various purposes, eg to define a course, to restrain spectators, or to confine a ball, as in netting around tennis courts or in cricket nets. In barriers used at horse racing venues, rails define the course to be taken by the horses. Such rails are mounted on posts which are commonly offset from the rails so that the bases of the posts do not interfere with the horses' hooves. Because the posts are exposed on the side of the barrier opposite to the rails, however, such a barrier may only be installed at the sides of the racetrack area.

Horse racing damages the surface of the race track and the track must be permitted to recover between race meetings. If the whole track is used and is damaged, as may particularly occur for soft ground in adverse weather conditions, then there may be insufficient time before the next race meeting for the track to recover. This may necessitate postponement or cancellation of the following race meeting with a consequential loss of revenue for the racecourse owner.

Known barrier systems suffer from numerous other disadvantages. In some cases, the system comprises uprights which are sunk directly into the ground. Impact, eg of a competitor, with such systems can cause them to lean over and not return to the original position. This may make the rail system less effective and also appears unsightly.

To overcome this problem, the base of the upright may be fixed in, for example, concrete. However, this increases the installation cost and makes the system difficult to remove, as may be necessary if the course is changed. In addition, since the system is frequently manufactured from material which is

infl xibl , it will not absorb an impact. This increases the risk of injury to competitors. In extreme cases, the upright may snap leaving the remaining portion dangerously exposed.

In other systems, the upright is tubular and fits over an upstanding rod which is fixed in the ground. Again, however, there is a risk of breakage of the upright, in which case the upstanding rod represents a considerable danger.

There have now been devised barrier systems which overcome or substantially mitigate some or all of the above-mentioned disadvantages.

According to the invention, there is provided a barrier system comprising a plurality of tubular uprights and a pair of parallel rails held in spaced apart relation on opposite sides of the uprights.

The barrier system according to the invention is advantageous primarily in that the fact that rails are spaced from the uprights on both sides of the uprights means that the track areas on either side of the barrier may safely be used by, for example, horses. The barrier may therefore be used to divide a racetrack area into lanes. The lane on one side of the barrier may be used for one race meeting, and that on the other side for the next. This permits race meetings to be held more frequently.

By "a pair" of parallel rails is meant at least two rails. Although two rails is generally sufficient, for some applications additional rails may be provided on one or both sides of the uprights, or between the uprights.

The pair of parallel rails will generally be at or near the upper ends of the uprights.

Suitable coupling members are preferably used to space the rails from the upper ends of the uprights. For instance, a T-piece may

be used, the downward limb of the T-piece being tubular and receiving the upper end of the upright and the lateral limbs also being tubular and receiving short lengths of rod or tubing. Alternatively, the short lengths of tubing may be integral with the T-piece. The limbs of the T-pieces may be horizontal, or they may extend at an angle to the horizontal, eg as Y-pieces.

The free ends of the short lengths of tubing may then be received in limbs of further T-pieces, the other limbs of these T-pieces receiving the ends of the rails. In such a case, the internal diameters of the T-piece limbs will correspond to the respective external diameters of the upright and rail. This type of construction is particularly preferred since it enables a free space to be provided in the assembled barrier between the ends of adjacent rail. This free space permits elongation of the rails due to thermal expansion without distortion of the assembled barrier. Since the free space is enclosed within the T-piece, it is not visible and the overall structure has a smooth and pleasing appearance.

The T-pieces mounted on the ends of the uprights and those which receive the rails may be identical. Alternatively, eg where the rails and the upright have different diameters, the two forms of T-piece may be different.

The rails are preferably formed for male-female engagement. To this end, a short length of smaller diameter tubing may be fixedly secured within one end of each rail. The tubing will have an external diameter corresponding to the internal diameter of the rail, and will protrude from the rail to form a male end which is received in the female end of the adjoining rail. The smaller diameter tubing may be fixed in the rail by solvent cement or other conventional means.

In addition to the rails held in spaced apart relation from the upper ends of the uprights, further cross-members may be provided between successive uprights. To that end, collars may be fitted

to the uprights, the collars having suitable formations for receiving the ends of the cross-members. Indeed, the components used in the barrier system according to the invention may be used to form a wide variety of structures.

The uprights and the rails are conveniently manufactured by extrusion. A variety of plastics materials may be used, with the most convenient being polyvinylchloride. The extruded tubular uprights and rails may easily be cut to length. Uprights and rails of plastics material are relatively light in weight and are easy and inexpensive to manufacture and assemble.

It is particularly preferred that the uprights be located in sunken fixings, each fixing having a vertical channel which receives the lower end of an upright. This arrangement is advantageous in that the sunken fixings ensure that when the barrier is removed there are no potentially dangerous projections above ground level. Being of plastics material, the uprights and rails are relatively flexible and therefore capable of absorbing an impact. Being resilient and securely supported by the fixings, however, the barrier returns to its original position after impact.

Thus, according to another aspect of the invention, there is provided a barrier system comprising a plurality of tubular uprights of plastics material, said uprights being located in sunken fixings, each fixing having a vertical channel which receives the lower end of an upright.

The fixing is preferably such as to provide a secure footing for the upright. A particularly preferred form of fixing is that sold under the registered trade mark METPOST. This comprises a tubular upper portion which, in use, receives the lower end of the upright. Below the upper portion is a tapered stabilising portion of X-shaped cross-section.

The invention will now be described in greater detail, by way of

illustration only, with reference to the accompanying drawings, in which

Figure 1 is a side view of a rail assembly according to the invention;

Figure 2 is a plan view of the rail assembly of Figure 1;

Figure 3 is a view along the line III-III in Figure 2;

Figure 4 is a perspective view of a sunken fixing forming part of the rail assembly of Figure 1;

Figure 5 is a sectional view of a first form of T-piece forming part of the rail assembly of Figure 1;

Figure 6 is a sectional view of a second form of T-piece, forming part of the rail assembly of Figure 1, showing also the engagement of adjacent rails;

Figure 8 is a side view of a third embodiment of a barrier according to the invention, including a mesh panel;

Figure 9 is a detailed view of a variant of the rail assembly of Figure 1, in which a portion may be opened for access;

Figure 10 is a sectional view showing locking means which may be used in barrier systems according to the invention; and

Figure 11 is a side view of a further embodiment of a barrier according to the invention.

Referring first to Figures 1 to 3, a rail for use at a racing track comprises tubular uprights 1 of extruded PVC with an external diameter of 64mm. A pair of 110mm external diameter tubular rails 4, 4a also of extruded PVC, are held in spaced apart relation from the top of the uprights 1 by short lengths 5, 5a of



tubing which locate in the lateral limbs of a first form of T-piece 3. The downward limb of the T-piece 3 receives the upper end of the upright 1. This form of T-piece 3 is shown in more detail in Figure 5.

The outer ends of the tubing lengths 5, 5a are received in a 64mm internal diameter socket 61 of a second form of T-piece 6, 6a, shown in Figure 6. The second form of T-piece 6 is also provided with a pair of communicating slip sockets (internal diameter 110mm) into which the ends of adjacent rails 4 are inserted.

As shown in Figure 6, a length of smaller diameter tube 41 is fixed within the end of one of the rails 4 to form a male projection which is received within the end of the other rail 4. A gap 42 between the facing end surfaces of the two rails 4 allows for thermal expansion of the rails 4.

The lower end of each upright 1 locates in a sunken fixing 2 of the type sold under the registered trade mark METPOST. This is shown in more detail in Figure 4 and comprises a tubular upper portion 21 which receives the lower end of the upright 1, and a tapered lower portion 22 with an X-shaped cross-section. In use, the fixing 2 is driven into the ground at the desired location until its top surface is substantially flush with the ground level. The lower end of the upright 1 is then simply inserted into the upper portion 21 of the fixing 2. The fixing 2 may alternatively be secured in, for instance, concrete, but this is generally not necessary.

The race rail system shown in Figures 1 to 6 may be used to divide a racetrack into two or more lanes. Horses on either side of the rail are kept away from the uprights 1 by the respective rails 4, 4a. In addition, the resilience of the PVC tubing used acts against the weight of a horse bearing against the rail and returns the rail to the upright position. Since there is no rigid upstanding rod within the tubular upright, the upright is able to flex along all of its length from ground level upwards.

In the event, however, that the force acting on the rail becomes too great, then the rails 4 simply become disconnected from the T-pieces 6, without any breakage of any of the components. In particular, no potentially dangerous upstanding spikes or projections are exposed.

In the embodiment shown in Figure 7, the top portion of the upright 71 is bent through 90° and a T-piece 72, similar to the second T-piece 6 of Figures 1 to 3, is fitted directly to the end of the upright 71. A pair of rails are supported on the opposite side of the upright 71 by T-pieces 73 which are similar to that of Figure 5. The T-pieces 73 are slidably mounted about the upright 71 and fixed in position by any suitable means, eg a rivet. Extending laterally from the T-pieces 73 are short lengths of tubing 74 which support further T-pieces 75, which are identical to the T-piece 72 and support rails in the same manner.

In the embodiment of Figure 8, a plastic-coated wire mesh panel 81 is stretched between two uprights 82, 83. Solid panels, for example advertising hoardings, could be supported in a similar manner.

Referring now to Figure 9, in a variant of the assembly shown in Figure 1, containing a portion which may be opened for access, 110mm diameter rails 91 are supported at their ends by two T-pieces 92, 93 which in turn are mounted on the upper ends of two uprights 94, 95. The uprights 94, 95 and the T-pieces 92, 93 are identical to those shown in Figures 1 and 2 respectively. The uprights 94, 95 are separated by 4m and a smaller diameter rail 96 of that length is supported between them, its ends being received within the open ends of the 110mm rails 91. An opening may be formed in the barrier, eg to provide temporary access, by sliding the smaller diameter rail 96 into one or other of the 110mm rails 91. Suitable stops means, eg pins driven into the rails 91 at suitable points, may be provided to limit the movement of the sliding rail 96. An arrangement as shown in Figure 9 may be used, for example, at a part of the barrier

through which horses gain access to the track, or to permit rapid positioning and removal of starting stalls. Figure 10 shows a mechanism by which components of a barrier system according to the invention may be locked together. A socket 101 is provided with two diametrically opposed apertures 102. An upright 103 is similarly provided with a pair of apertures 104. Cylindrical studs 105 are riveted to the ends of a U-shaped resilient metal band 106. The band 106 is inserted into the open end of the upright 103 such that the studs 105 locate in the apertures 104 and are biased outwards by the resilience of the band 106.

To connect the upright 103 to the socket 101, the studs 105 are pressed inwards and the end of the upright 103 inserted into the socket 101. The studs 105 are held down until they are covered by the end of the socket 101. The upright 103 is pressed into the socket 101 until the studs 105 come into registration with the apertures 102 whereupon they move outwardly under the influence of the band 106 and engage in the apertures 102, locking the upright 103 and the T-piece together.

In general, a locking assembly of the type shown in Figure 10 may be used for the locking together of any components which might need to be disassembled. Where disassembly is not envisaged to be necessary, the components may be fixedly connected by conventional means, eg rivets or solvent adhesive.

Finally, Figure 11 shows a fence comprising, in addition to rails 111, a pair of cross-members 112, 113. The uppermost rails 111 are supported in the same manner as described previously. The cross-members 112, 113 are supported by X-shaped coupling members 115 which are slidably mounted on the uprights 116 and secured in vertical position by rivets. The coupling members 115 support rails on both sides of each upright 116. In this embodiment,

both the uprights 116 and the cross-members 112, 113 are PVC tubes of 64mm diameter.

Although described above primarily in connection with rails for racing tracks, it will be appreciated that the barrier according to the invention may find widespread application in sporting and other environments. Apart from fencing of various kinds, the system of the invention may be used, for instance, to support netting around, for example, tennis courts or cricket nets.

Claims

1. A barrier system comprising a plurality of tubular uprights and a pair of parallel rails held in spaced apart relation on opposite sides of the uprights.

2. A barrier system as claimed in Claim 1, wherein the parallel rails are at or near the upper ends of the uprights.

3. A barrier system as claimed in Claim 1 or Claim 2, wherein coupling members are used to space the rails from the uprights.

4. A barrier system as claimed in Claim 3, wherein the coupling member comprises a first T-piece having a downward limb which receives the upper end of the upright and two lateral limbs which are connected to the rails.

5. A barrier system as claimed in Claim 4, wherein the lateral limbs of the first T-piece are disposed horizontally.

6. A barrier system as claimed in Claim 4, wherein the lateral limbs of the first T-piece are disposed at an angle to the horizontal.

7. A barrier system as claimed in any one of Claims 4 to 6, wherein the lateral limbs of the first T-piece are formed integrally with the first T-piece.

8. A barrier system as claimed in any one of Claims 4 to 6, wherein the lateral limbs of the first T-piece comprise lengths of rod or tubing which are received within sockets formed in the first T-piece.

9. A barrier system as claimed in any one of Claims 4 to 8, wherein the coupling member engages the rail by means of a second T-piece mounted on the end of the lateral limb of the first T-piece.

10. A barrier system as claimed in any preceding claim, wherein each rail comprises lengths of extruded plastics tubing disposed in end-to-end relationship.

11. A barrier system as claimed in Claim 10, wherein there is a space between the end faces of adjacent lengths of tubing to permit thermal expansion of the tubing.

12. A barrier system as claimed in Claim 9 and Claim 10, wherein the ends of adjacent lengths of tubing and the free space between them are received within a second T-piece.

13. A barrier system as claimed in any one of Claims 9 to 12, wherein the lengths of plastics tubing are formed for male-female engagement.

14. A barrier system as claimed in Claim 13, wherein a short length of smaller diameter tubing having an external diameter corresponding to the external diameter of the rail is fixedly secured within one end of each length of plastics tubing so as to form a male projection which can be received within the other end of another length of plastics tubing.

15. A barrier system as claimed in any preceding claim, wherein cross-members are fitted between successive uprights.

16. A barrier system as claimed in any preceding claim, wherein the uprights and/or rails are manufactured from extruded polyvinylchloride.

17. A barrier system as claimed in any preceding claim, wherein the uprights are located in sunken fixings, each fixing having a vertical channel which receives the lower end of an upright.

18. A barrier system comprising a plurality of tubular uprights of plastics material, said uprights being located in sunken fixings, each fixing having a vertical channel which receives the

lower end of an upright.

19. A barrier system as claimed in any preceding claim, wherein the rail is tubular and a portion of the rail comprises a tube of smaller diameter than an adjacent portion of the rail such that the smaller diameter rail may be inserted into the adjacent portion to form a temporary opening in the barrier.

20. A barrier system as claimed in any preceding claim, wherein there are provided locking means for releasable engagement of two interfitting components.

21. A barrier system as claimed in Claim 20, wherein the locking means comprise lugs in one component which locate in apertures or recesses in the other component.

22. A barrier system as claimed in Claim 21, wherein the first component is tubular and the lugs are biased outwardly through apertures in the wall of the tubular first component by a resilient spring housed within the tubular first component.

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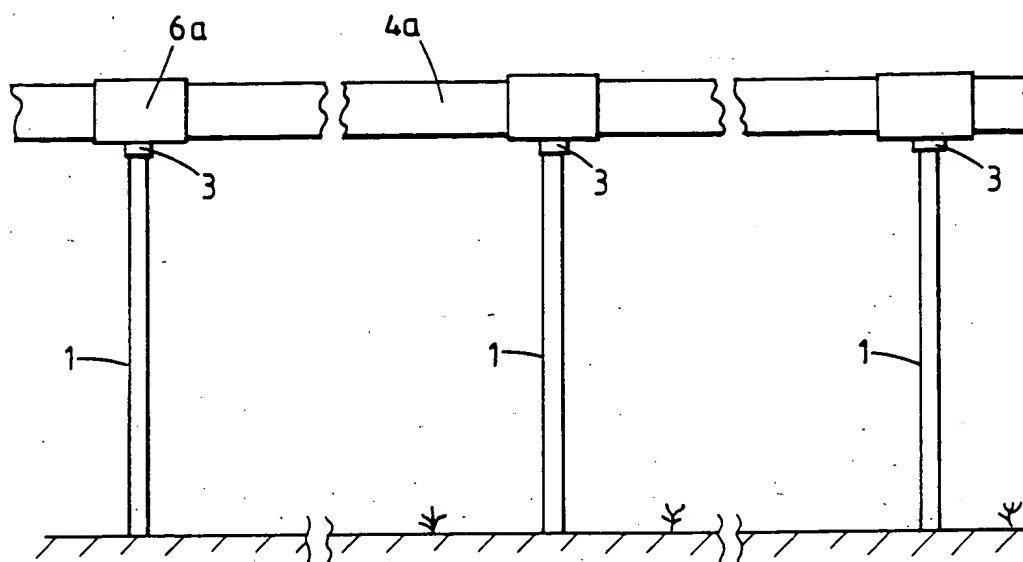


FIG. 1.

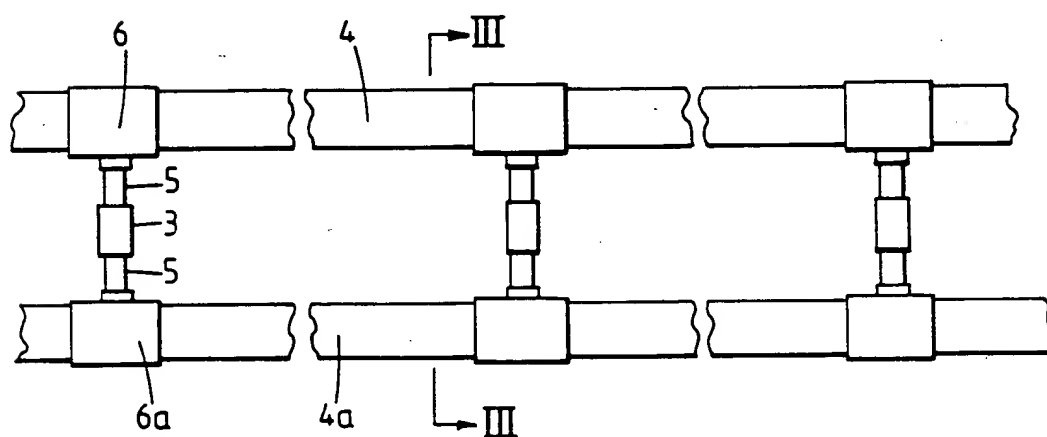


FIG. 2.



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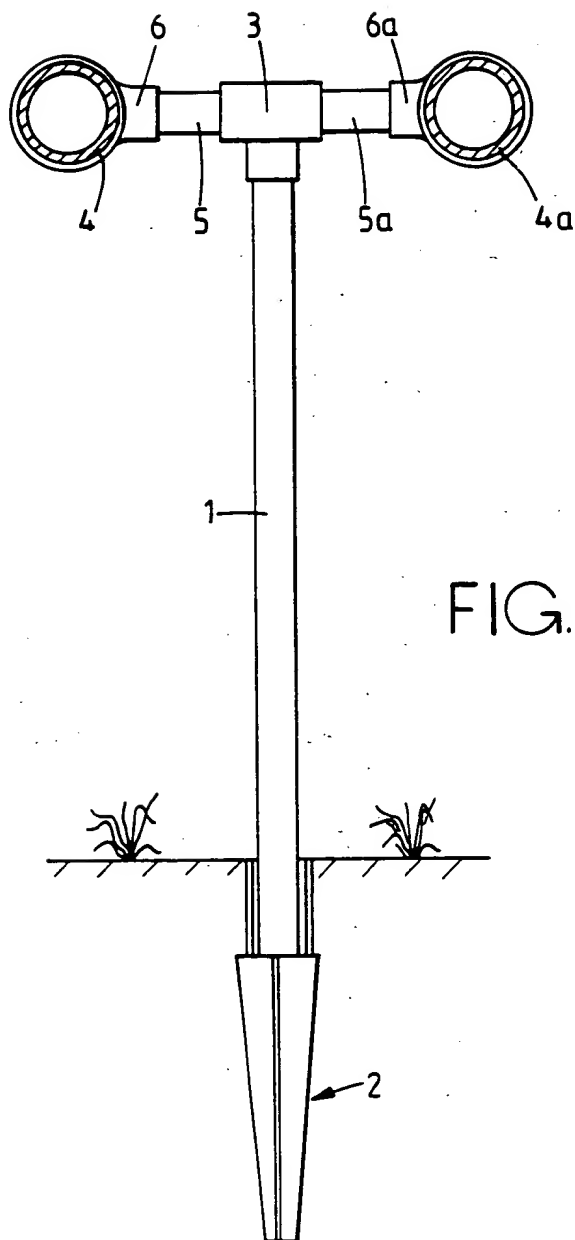


FIG. 3.

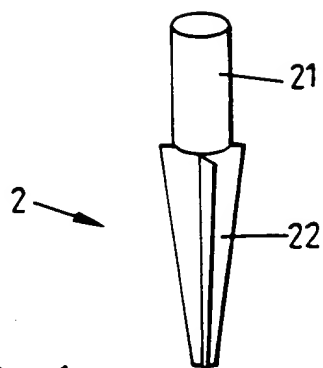


FIG. 4.

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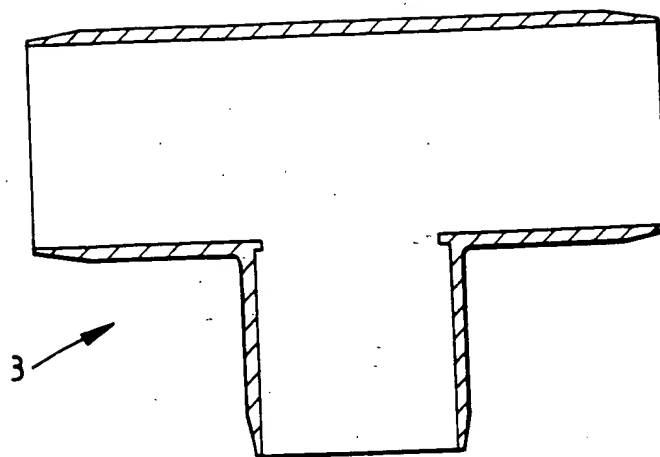


FIG. 5.

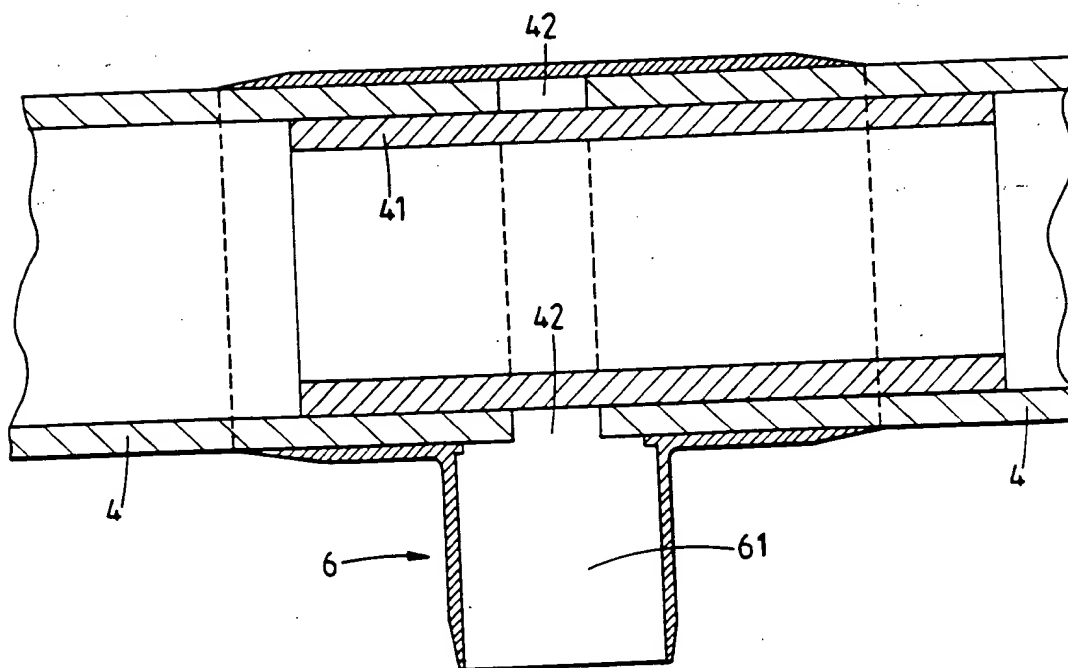
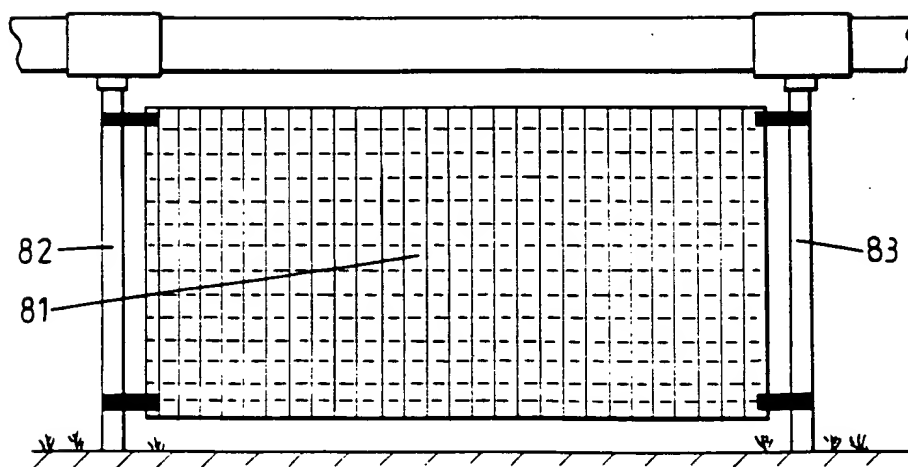
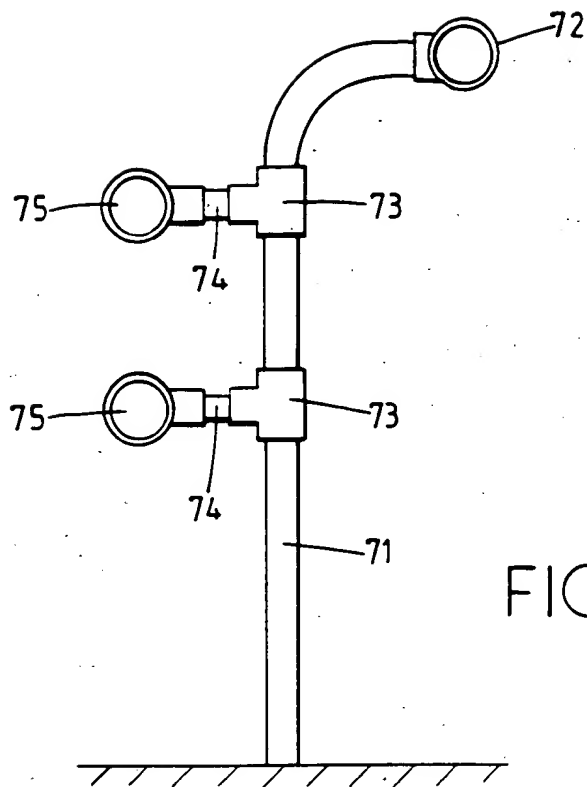


FIG. 6.

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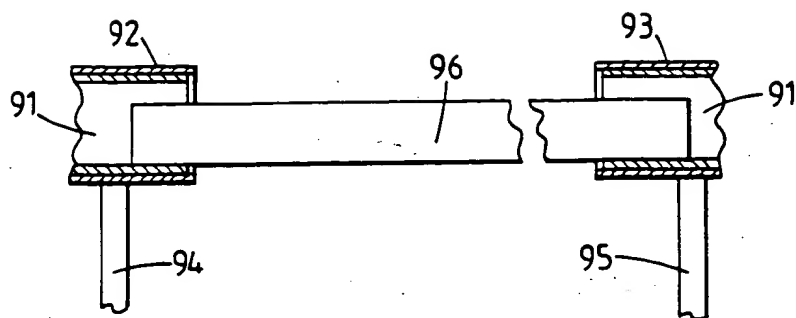


FIG. 9.

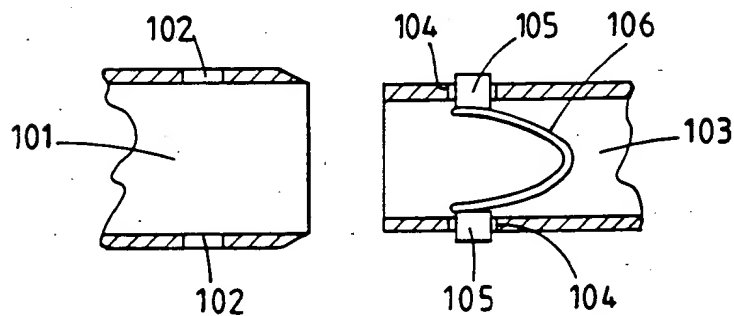


FIG. 10.

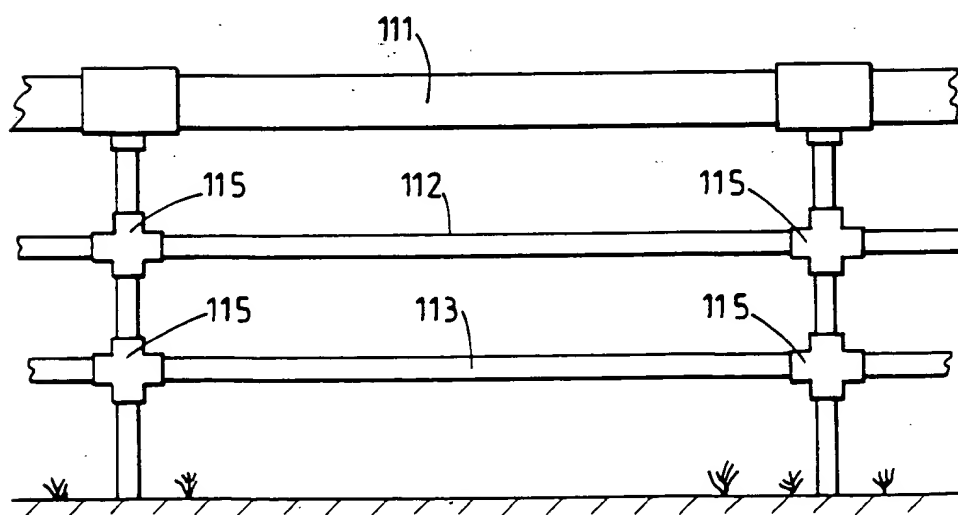


FIG. 11.

## INTERNATIONAL SEARCH REPORT

International application No.

PC 94/00979

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 5 E04H17/14 E04F11/18 A63K1/00

According to International Patent Classification (IPC) or to both national classification and IPC

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X	US,A,2 834 621 (J. B. SCHROER) 13 May 1958 see column 1, line 61 - column 3, line 13; figure 5	1-3
Y		4,5,8-17
X	US,A,4 610 432 (R. T. LEWIS ET AL.) 9 September 1986 see column 2, line 28 - column 9, line 17; figures 1-8,10-12	18
Y		4,10,13, 14,16,17
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Date of the actual completion of the international search

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Date of mailing of the international search report

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US-A-4610432	09-09-86	NONE	
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US-A-3441253	29-04-69	NONE	